

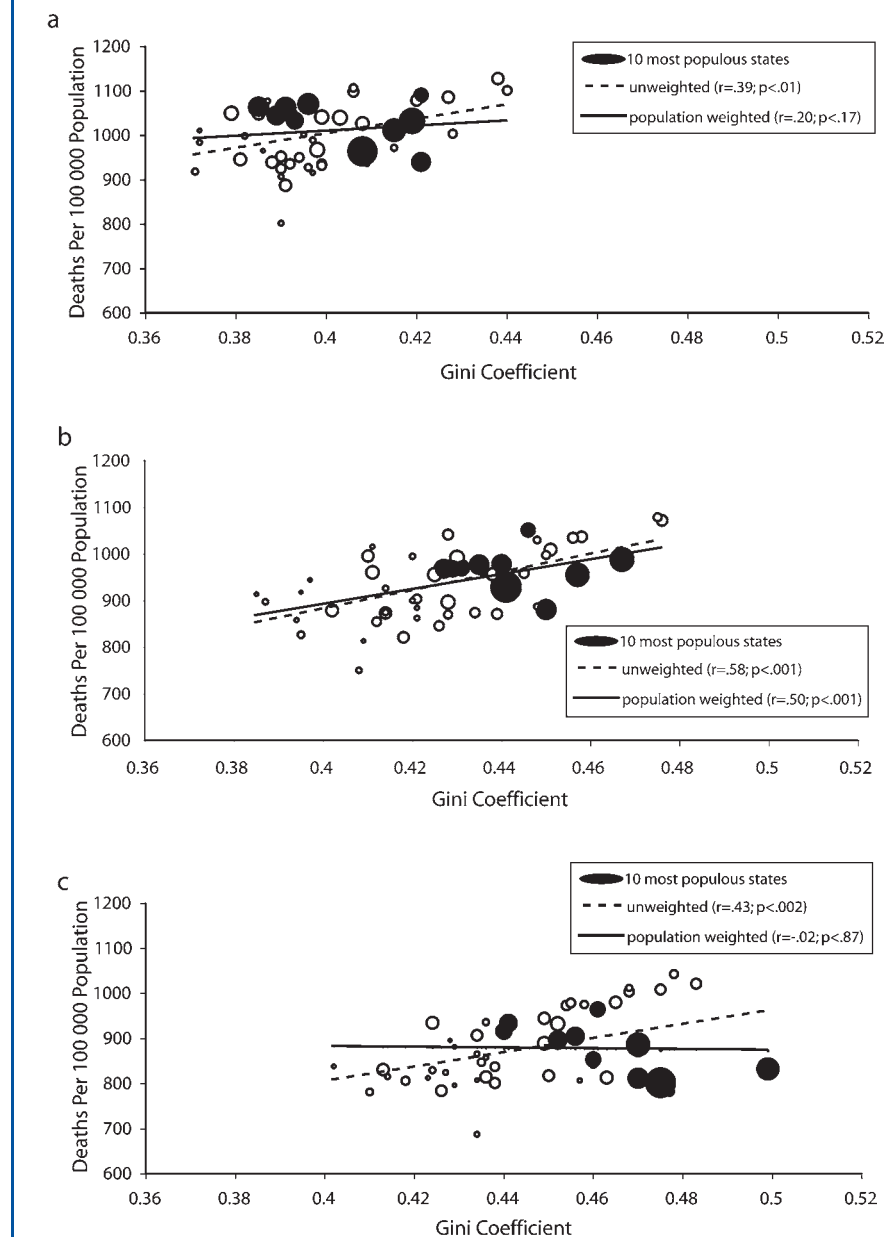
## ASSOCIATION BETWEEN INCOME INEQUALITY AND MORTALITY AMONG US STATES: CONSIDERING POPULATION AT RISK

Lynch et al.'s recent analysis of the last 6 US census periods suggests that the relationship between income inequality and mortality is less enduring than was previously thought.<sup>1</sup> Statistically significant correlations between state household Gini coefficients and age-adjusted death rates were reported only for the years 1979, 1989, and 1999.

The graphs presented by Lynch et al. omit the population at risk. The authors treat the state as the unit of analysis, which ignores the substantial variation in state populations. From the perspective of population exposure, state-based correlations will favor less populous states. Weighting the correlations by state population will correct this bias and provide an alternate perspective. A population-weighted analysis is also reasonable because income inequality is considered to be a risk factor for individual health.<sup>2,3</sup>

In Figure 1, state-based correlations between state household Gini coefficients and age-adjusted death rates are compared with population-weighted correlations; the year 2000 is used as the standard.<sup>4,5</sup> Each state is represented by a circle, and the size of the circle indicates the size of the state's population. The filled circles represent the 10 most populous states (in descending order, California, Texas, New York, Florida, Illinois, Pennsylvania, Ohio, Michigan, New Jersey, and Georgia).

Except for the year 1989, the population-weighted correlations are substantially weaker than the ones reported by Lynch et al. The filled circles in Figure 1 reveal the reason for this. There appears to be no associa-



Note. Circles represent states and are sized according to population size; filled circles represent the 10 most populous states.

**FIGURE 1—State-based correlations between state household Gini coefficients and age-adjusted death rates compared with population-weighted correlations: United States, 1979 (a), 1989 (b), and 1999 (c).**

tion between income inequality and mortality in the 10 most populous states in 1989. In 1979 and 1999 the associations appear to be negative, results that conflict with theory.<sup>6</sup> Incidentally, the most populous states include some of the largest cities with the highest degrees of income inequality.<sup>7</sup>

As observed by Lynch et al., the population-based correlations indicate that only the year 1989 was exceptional, showing a strong correlation between income inequality and mortality in US states. The lack of correlation for the year 1999 is certainly unexpected, as US income inequality did not decline in the 1990s.<sup>8</sup>

The inconsistent results found in the population-based analysis suggest that the association between income inequality and mortality is less pervasive than reported by Lynch et al. The temporal volatility of the population-based correlations probably reflects the work of known confounders such as educational attainment, racial composition, population residence, and household income.<sup>9,10</sup> Statistically controlling for such factors might clarify the association between income inequality and mortality in the United States. ■

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doi:10.2105/AJPH.2005.079897

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